(12) UK Patent Application (19) GB (11) 2 259 946 (13) A

(43) Date of A publication 31.03.1993

(21) Application No 9120136.8

(22) Date of filing 20.09.1991

(71) Applicant
Malcoe Precision Fabrications Limited

(Incorporated in the United Kingdom)

Avebury House, St Peter Street, Winchester, Hants, SO4 3WX, United Kingdom

(72) Inventors
Stuart Frank Copping
Michael Richard Taylor

(74) Agent and/or Address for Service
D Young & Co
10 Staple Inn, London, WC1V 7RD, United Kingdom

(51) INT CL[5]
E05D 5/02

(52) UK CL (Edition L)
E2F FED
U1S S2207 S2213

(56) Documents cited
GB 1365474 A GB 1341709 A GB 0657948 A
US 4543687 A

(58) Field of search
UK CL (Edition K) E2A AEC APE, E2F FCD FCK FCL FCQ FED FPX
INT CL[5] E05D 5/02 5/04 11/00
Online database: WPI

(54) Hinge

(57) A butt hinge comprises a first plate 2 and a second plate coupled by a spigot joint and the peripheral edges of the butt hinge plates are sloped to provide resistance to chiselling and levering. Fixing bosses 8 extend from the rear face of the hinge to provide strengthened fixing. The fixing bosses 8 are provided with a tapped blind bore into which bolts are fixed from the inside of the door or door post. A hinge backing plate 28 is used to strengthen the mounting. The first and second plates forming the butt hinge are integral castings in stainless steel.

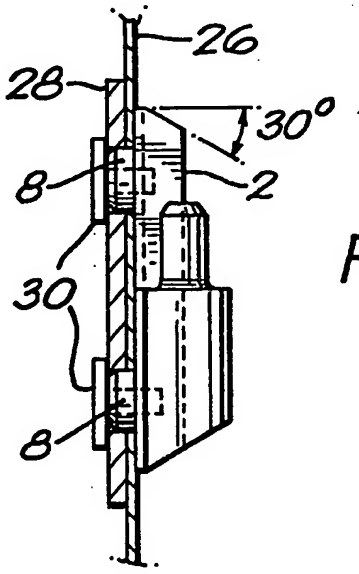


FIG. 4

GB 2 259 946 A

FIG. 1

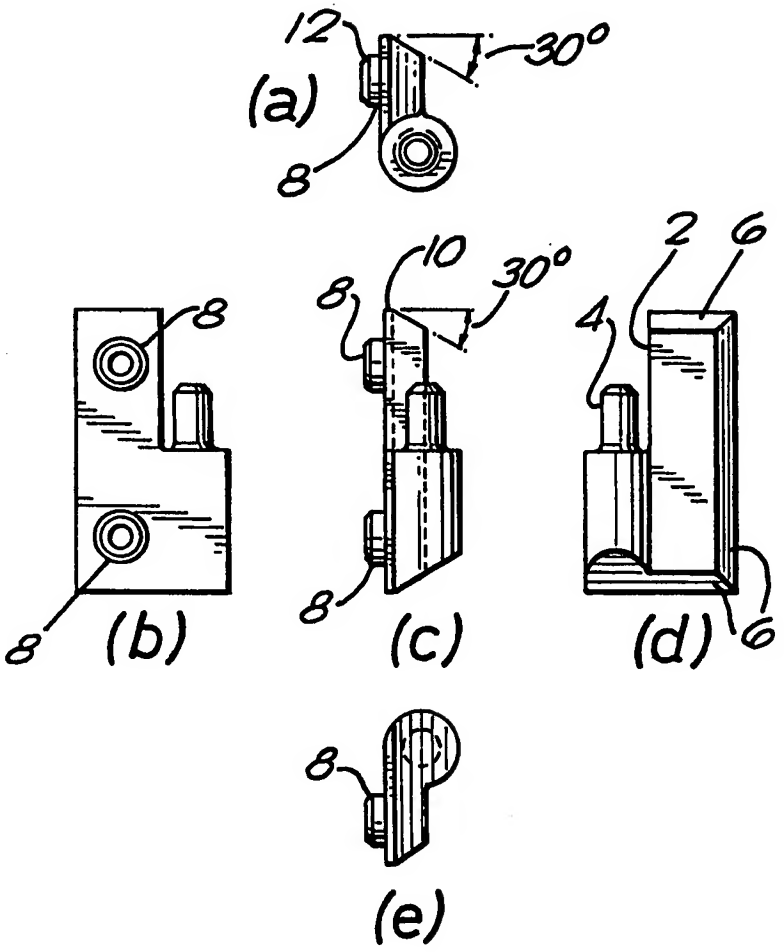


FIG. 2

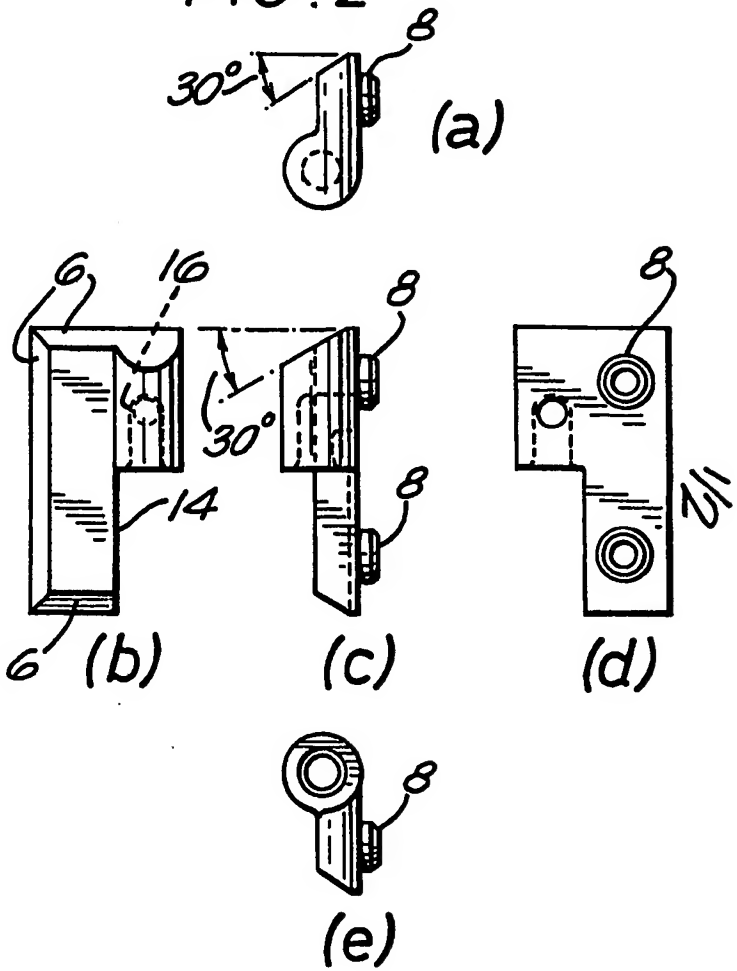
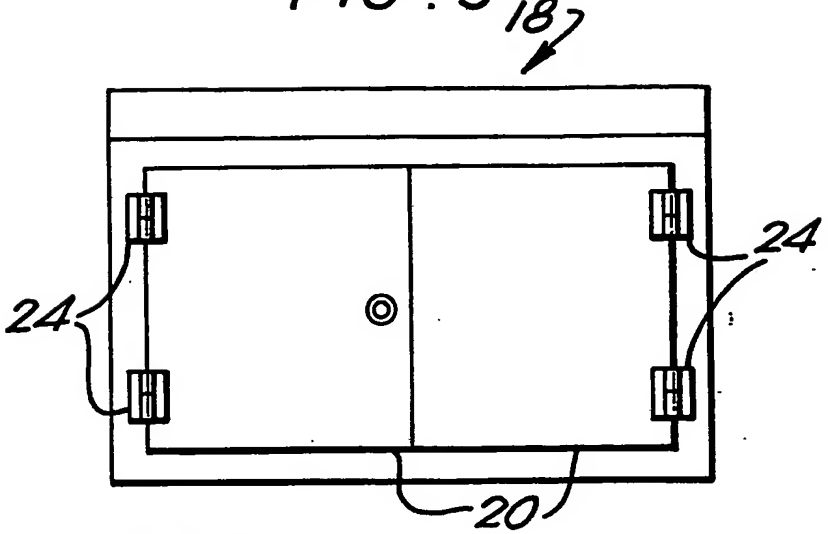


FIG. 3



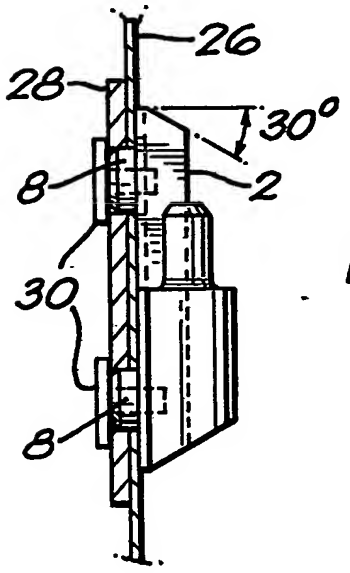
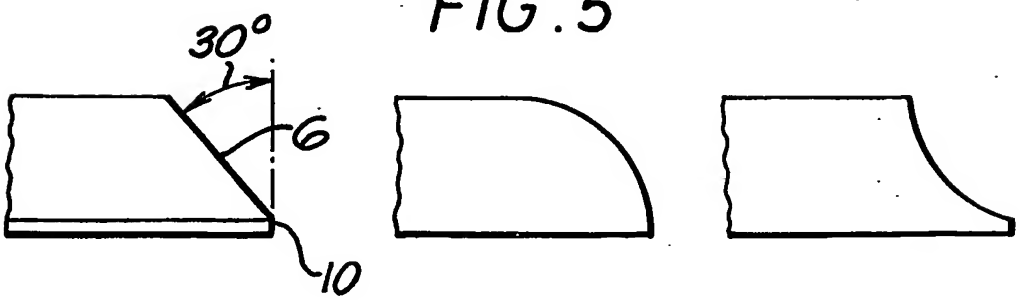


FIG. 4

FIG. 5



HINGE

This invention relates to the field of hinges. More particularly, this invention relates to the field of butt hinges for use in situations where a high degree of security is needed.

There are many known hinge designs, each being adapted for use in various situations. The form and degree of security of these different designs varies widely. The type of hinge that can be used in any given situation is often constrained by factors such as the required fitting and opening angle of the door, the thickness of the material of the door and door post to which hinge is to be attached and aesthetic considerations. Meeting these former factors sometimes dictates using a hinge affording a lower degree of security than would otherwise be desirable.

An example of such a situation occurs with enclosures of the type used to house electronic apparatus in an open air street position. These enclosures typically house high value electronic equipment (e.g. telephone and cable television apparatus) and are provided with doors to provide easy access to the equipment for maintenance, installation and for forth. The open air street position and high value of their contents demand that such enclosures should provide a high degree of security and durability so as to resist theft and vandalism.

To this end, it would be desirable to provide a sheet steel enclosure with outward opening flush fitting doors. One possibility for the hinges that could be used would be butt hinges. Such hinges fitted on the outer face of the enclosure would allow flush fitting, outward opening doors and easy fixing to sheet steel, as well as being relatively simple, cheap and readily available. Unfortunately, known butt hinges do not provide a sufficiently high degree of security for use in such situations. This invention addresses the problem of providing a butt hinge with improved resistance to theft, vandalism and environment attack.

According to the present invention there is provided a butt hinge having a sloped peripheral edge. The invention recognises that as a butt hinge is made thicker to increase strength it becomes more vulnerable to being levered or chiselled off, and reduces this problem by sloping the peripheral edge of the hinge to prevent a good grip on

the hinge being obtainable and to deny a square face to chisel against.

Having recognised and overcome this first weakness, other potential weaknesses reveal themselves. One such problem is fixing the hinge to the door and door post. Screws or bolts fixed into through bores in the plates of the hinge would be vulnerable to being undone from the outside. One possible solution that might be suggested would be the use of blind bores in the rear face of the hinge into which screws or bolts can be fixed from inside the enclosure. Whilst such an arrangement prevents the screws or bolts being undone from outside the enclosure, it does suffer from the problem that shear forces applied to the hinge act directly on the screw or bolt. Accordingly, preferred embodiments of the invention further comprise fixing bosses extending from the rear face of said butt hinge. These bosses may include blind bores into which screws or bolts are fixed or may be threaded on their outer surface at their end to enable a nut to be attached to them. The smooth face of the bosses where they pass through the enclosure allows a closer tolerance to be used thereby reducing the amount of play in the mounting.

In a butt hinge having the above features a significant factor becomes the material from which the hinge is formed. It has been found that stainless steel is particularly suitable due to its high strength and good environmental resistance.

In a preferred embodiment of the invention the pivotal connection is provided by a spigot type joint with a post from one plate fitted with a bore in another plate. Such a joint can be made strong with the use of a relatively thick post.

Strength and environmental resistance are further improved if said first and second plates, and respective male and female parts of said spigot joint are integral items.

It will be appreciated that the two integral parts of the hinge could be formed by machining, but in advantageously simple and effective embodiments said first and second plates and respective male and female parts of said spigot joint are castings.

Another preferred feature is that the male part of said spigot joint lies at least partially behind the front face of said first and second plates. This helps protect the joint from being attacked by sawing through the male part.

The form and angle of the sloped peripheral edge can be varied. If the angle is too small, then the resistance to levering and chiselling is reduced. If the angle is too large, then the overall strength of the hinge can be compromised due to a reduction in thickness of a substantial part of its body. The sloped peripheral edge can have the from of a curve or a straight slope. Whilst providing some increase in security, curved faces are generally less effective than straight slopes. Accordingly, in preferred embodiments said sloped peripheral face is a straight slope at an angle of between 20 to 45 degrees. An angle of substantially 30 degrees has been found particularly suitable.

As mentioned above, the use of fixing bosses allow closer tolerances in the mounting of the hinge, but this can bring with it increase difficulty in assembly. To reduce this problem said bosses have a bevelled outer circumferential edge. This helps guide the bosses through the corresponding holes in the door and door frame during assembly.

The hinge is particularly suitable for use with enclosures having flush fitting, outward opening doors and strength can be further increased by the use of a hinge backing plate with holes for receiving the bosses.

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 shows various views of a first part of a butt hinge;

Figure 2 shows various views of a second part of a butt hinge;

Figure 3 shows an enclosure using the butt hinge of Figures 1 and 2;

Figure 4 shows in more detail the fixing of a first part of the butt hinge to the enclosure of Figure 3; and

Figure 5 shows various different slopes that can be applied to the peripheral edge of the butt hinge.

Figures 1 and 2 show the first and second parts/plates of a butt hinge. Figure 1 shows the first plate 2 with the male part of the spigot joint or post 4. The peripheral edge 6 of the hinge is sloped at an angle of 30 degrees to the normal. To ease manufacture there is a narrow, non-sloped lip 10 around the peripheral edge of the hinge adjacent the rear face.

Extending from the rear face of the hinge are fixing bosses 8. The fixing bosses 8 are drilled with a blind bore and tapped to accept bolts from the inside of any door or door post upon which they are fixed. The outer circumferential edge 12 of the fixing bosses 8 is bevelled to ease assembly.

As can be seen most clearly from view (c), the male part of the spigot joint 4 lies partially behind the front face of the hinge. This goes some way towards protecting the male part 4 of the spigot joint from being sawn through from outside of the enclosure.

Figure 2 shows the second plate 14 of the butt hinge bearing the female part or blind bore 16 of the spigot joint. This second plate 14 has a similarly sloped peripheral edge and fixing bosses.

The first and second plates 2, 14 are integral lost-wax castings made in stainless steel. The integral form of the first and second plates 2, 14 increases strength and reduces the likelihood of corrosion due to interfaces between different sorts of metal.

Figure 3 shows an enclosure 18 with flush fitting outward opening doors 20 hinged with the butt hinges 24 as shown in Figures 1 and 2. The enclosure 18 is made of galvanised steel plate. Since the doors 20 are flush fitting within a recess in the front face of the enclosure 18, they cannot be lifted upwards to disengage the two parts of the butt hinges 24 when the doors are locked. Conversely, when the doors 20 have been unlocked and opened, the spigot joint of the butt hinge allows the doors 20 to be lifted off for improved access.

Figure 4 shows the fixing of the first plate 2 of the butt hinge to the enclosure. The fixing bosses 8 pass through matching holes drilled in the galvanised steel plate 26 and the hinge backing plate 28. Bolts 30 fix into the tapped blind bores within the fixing bosses 8. The relatively close tolerances, which the use of the fixing bosses 8 allows, coupled with the presence of the hinge backing plate provides a strong mounting with little free play.

Figure 5 illustrates various slopes that can be used on the peripheral edge 6 of the butt hinge. Both convex and concave curves would provide an improvement in security over a standard right angled slope, but the preferred embodiments of the invention use a straight sloped edge extending substantially over the entire height of the first and second plates. If the slope is much less than 20 degrees then the

resistance to levering and chiselling is reduced. If the slope if much greater than 45 degrees then there is an undue thinning of the plate, particularly around the spigot joint, which unnecessarily weakens it. A slope at an angle of 30 degrees to the normal has been found to be particularly suitable.

CLAIMS

1. A butt hinge having a sloped peripheral edge.

2. A butt hinge as claimed in claim 1, further comprising fixing bosses extending from the rear face of said butt hinge.

3. A butt hinge as claimed in any one of claims 1 or 2, wherein said butt hinge is formed from stainless steel.

4. A butt hinge as claimed in any one of claims 1, 2 or 3, comprising first and second plates pivotally connect by a spigot joint.

5. A butt hinge as claimed in claim 4, wherein said first and second plates and respective male and female parts of said spigot joint are integral items.

6. A butt hinge as claimed in claim 5, wherein said first and second plates and respective male and female parts of said spigot joint are castings.

7. A butt hinge as claimed in any one of claims 4 to 6, wherein the male part of said spigot joint lies at least partially behind the front face of said first and second plates.

8. A butt hinge as claimed in any one of the preceding claims, wherein said sloped peripheral edge is straight slope at an angle of between 20 to 45 degrees.

9. A butt hinge as claimed in claim 8, wherein said sloped peripheral edge is straight slope at an angle of substantially 30 degrees.

10. A butt hinge as claimed in any one of claims 2 to 9, wherein said bosses have a bevelled outer circumferential edge.

11. An enclosure with a door mounted on a hinge as claimed in any one of claims 1 to 10.

12. An enclosure as claimed in claim 11, wherein said door is an outward opening, flush fitting door.

13. An enclosure with a door mounted on a hinge as claimed in any one of claims 2 to 10, wherein said bosses extend through the wall of said enclosure and a hinge backing plate.

14. A hinge substantially as hereinbefore described with reference to the accompanying drawings.

15. An enclosure substantially as hereinbefore described with reference to the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number: 9120136.8

Relevant Technical fields

(i) UK Cl (Edition K) E2F (FED, FCK, FCL, FCQ, FCD, FPX): E2A (APE) E2A (AEC)

(ii) Int Cl (Edition 5) E05D 5/02: 5/04: 11/00

Search Examiner: A H MITCHELL

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES WPI:

Date of Search: 6 DECEMBER 1991

Documents considered relevant following a search in respect of claims 1-15

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 1365474 (SINTACEL) note the tapered edge - Figure 5	1, 2
Y	GB 1341709 (SHAW) note page 2 lines 40, 41	4, 5, 7
X	GB 657948 (GELSTON)	1
X:Y	US 4543687 (LAW)	X: 1 Y: 4, 5, 7

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

Published 1993 at The Patent Office, Concept House, Cardiff Road, Newport, Gwent NP9 1RH. Further copies may be obtained from Sales Branch, Unit 6, Nine Mile Point, Cwmfelinfach, Cross Keys, Newport, NP1 7HZ. Printed by Multiplex techniques ltd, St Mary Cray, Kent.